

Bevington Bridge
Spanning Middle River at Warren Street
Bevington
Madison County
Iowa

HAER No. IA-37

HAER
IOWA
61-BEV,
1-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Rocky Mountain Regional Office
U.S. Department of the Interior
P.O. Box 25287
Denver, Colorado 80225

HISTORIC AMERICAN ENGINEERING RECORD

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Bevington Bridge
HAER No. IA-37

Location: Spanning Middle River at Warren Street
Bevington, Crawford Township, Madison County, Iowa

UTM: 15.433900.4578725
Quad: St. Charles, Iowa (7.5 minute series, 1983)

Date of Construction: June-July 1884

Designer: King Iron Bridge and Manufacturing Company, Cleveland, Ohio

Fabricator: King Iron Bridge and Manufacturing Company, Cleveland, Ohio

Builder: King and Twiss, Des Moines, Iowa

Present Owner: Town of Bevington, Iowa

Present Use: Roadway bridge (scheduled for replacement in 1992)

Significance: Built in 1884 in the crossroads town of Bevington, this wagon bridge consists of a pin-connected through truss, with iron cylinder piers and timber stringer approaches. This 102-foot channel span features typical 1880s Pratt configuration and pin-connected detailing. Bevington Bridge is significant as one of the last remaining examples in Madison County from what was once an extensive group of 19th century trusses, a well-preserved illustration of wrought iron truss construction.

Report Assembled by: Clayton B. Fraser
Fraserdesign
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June 1992

The Historic American Engineering Record (HAER) documentation for the Bevington Bridge was conducted by Fraserdesign of Loveland, Colorado, under contract with Madison County, Iowa. The town of Bevington, in conjunction with Madison and Warren counties, has proposed the replacement of the structure (Project No. BROS-61BE(1)) in 1992, and this recordation is intended to mitigate in part the impact on the bridge by this action. Field recording of the Bevington Bridge was undertaken in February 1992. The research for this project, conducted in April 1990 and February 1992, has involved six primary archival sources: the Madison County Auditor's Office, County Engineer's Office and the Winterset Public Library in Winterset, Iowa; the Warren County Auditor's Office in Indianola, Iowa; the State Historical Society Archives in Des Moines; and the Iowa Department of Transportation in Ames, Iowa.

The Mesquakie Indians of central Iowa called the region which encompasses Madison County the Three Rivers Country, after the three major watercourses that cut across it. These branches - now known as the North, Middle and South rivers - have played a central role in the county's development, as they both directed settlement and impeded overland travel in the region. Anglo-American settlement of the region began almost immediately after the Mesquakies left in 1845. By the end of the decade, the county had been widely homesteaded, and several towns had been established as centers of commerce. As towns such as Winterset (the county seat), St. Charles, Truro and Peru developed, an impromptu network of roads and trails formed to link them, following the typical pattern of settlement and transportation.¹

The North, South and Middle rivers formed the most serious impediments to overland travel, but several smaller streams required substantial bridged crossings as well. "Bridging the streams of Madison County has been an expensive proposition," reported Herman Mueller in the *History of Madison County*. "The [county] bridge fund has always been expended to the penny. North Branch, North River, Middle River, Jones Creek, Clanton, South River and Grand River and their tributaries have many crossings."² To bridge this myriad of streams, the county board of supervisors ordered numerous short-span timber pile and kingpost structures built in the 1850s and 1860s.³ Though inexpensive to erect, most of these spans tended to be structurally suspect and required frequent maintenance to prevent their collapse. Moreover, they were restricted to short-span crossings.

With limited funds and an abundance of crossings, the county elected to leave these earliest structures uncovered. This did not pose a serious threat to the timber pile spans, which rarely lasted long enough to suffer damage by rain and snow. But more complex

and expensive timber trusses, left open to the weather, proved vulnerable to deterioration in their upper chord connections. For this reason, the county began sheathing its wooden through trusses with shingle roofs and plank siding in the late 1860s. By most accounts, Madison County's first covered bridge was built over the North River in Union Township, just north of Eli Cox's farm and sawmill. Eli Cox himself milled the timbers, quarried the stones for the abutments and built the bridge in 1868, under contract with the county.⁴

Early in 1870 the board of supervisors codified bridge construction in the county, outlining super- and substructural specifications for future spans. As reported by the *Winterset Madisonian*:

Our Board of Supervisors have done well in adopting new rules to govern the erection of county bridges. There has been much complaint about the erection of county bridges, as to their stability and make. The plan by the Board does away with the stone abutments, thus saving such expense and enabling the county to build a number more bridges. It is claimed that timber can be readily replaced, and that ice will effect [sic] it less than stone. They also require that bridges shall be covered. The expense of the roof is more than made up by the permanency of the bridge. Instead of the old style framing for the support of the bent, they have adopted the lattice work frame like that used to support the ceiling of our court room.⁵

Over the next two years, the county built several other major covered bridges: the Wilkin's Ford Bridge over the Middle River in Union Township (moved in 1887 to the Imes Crossing of Clanton Creek and moved again in 1977 to a park in St. Charles), the Donahoe Bridge across the North River (similarly moved in 1970 to a park in Winterset), the Afton Bridge across the Middle River, the Rose Bridge across the North River in Jackson Township, and the Rhyno Bridge across Clanton Creek in South Township.⁶

Until now Madison County had built only timber and combination bridges. In 1872, however, the board of supervisors acted to erect the county's first iron structures as a more durable alternative to all-wood construction. That summer the board contracted with the King Iron Bridge and Manufacturing Company of Cleveland to build a wrought iron span across the Middle River at Compton's Mill.⁷ At this time the supervisors also began negotiating with their counterparts in Warren County to build an iron bridge at the newly platted town of Bevington on the county line.⁸ Madison County appropriated \$1000.00 for the structure over the Middle River, with the proviso that Warren County make a similar appropriation.⁹ The two boards eventually agreed to build the bridge; in 1873 Madison County hired the Wrought Iron Bridge Company of Canton, Ohio, to fabricate and erect the bridge at Bevington and another iron span over the Middle River at Patterson. The Bevington Bridge was completed later that year.¹⁰

Erection of these three iron bridges marked the beginning of the end for wood truss

Erection of these three iron bridges marked the beginning of the end for wood truss construction in Madison County. The transition was to be a slow one, however, as the county continued to build covered bridges throughout the 1870s and into the 1880s. During this period the board of supervisors relied principally on two local contractors, Eli Cox and J.P. Jones, not only to build the timber bridges, but to assemble the iron trusses as well. The iron superstructures were ordered from the Wrought Iron Bridge Company and the King Iron Bridge and Manufacturing Company, both of which maintained an active presence in Iowa through representatives based in Des Moines.

King's Iowa sales agent was George E. King, nephew of the firm's founder, Zenas King.¹¹ Soon after moving to Des Moines in 1875, George King co-founded King and Twiss as the western representative of his uncle's company. King later renamed the firm the George E. King Bridge Company and continued to erect iron and steel bridges until about 1905.¹² "Mr. Geo. E. King is General Agent [of the company] and Mr. G.A. Eberhart, Engineer," an 1888 gazette reported. "These gentlemen are practical and experienced engineers who are thoroughly posted in all the important and minor details of civil engineering. They construct Wrought Iron and Combination Bridges for Highways and Railroads, and manufacture Weldless Die Forged Eye Bars and all other latest improvements. They have built a large number of Bridges and Viaducts in nearly every state west of the Mississippi river. The strength and durability of these Bridges serve to show the excellence of the Company's work. They have built a good many Wrought Iron Truss Bridges which have been severely tested with very satisfactory results and have done a vast amount of difficult work for prominent railway companies."¹³ Although the truss superstructures were manufactured in Ohio, George King employed up to 350 men to erect bridges throughout the region. His extensive dealings with Madison County in the 1870s and 1880s typified the statewide trend that held the King Bridge Company as one of the most prolific bridge builders in Iowa during this time.

Madison County depended upon the King Bridge Company to an increasing degree in the early 1880s, as it finally ceased building timber trusses. The Hogback Bridge, erected in 1884 by J.P. Jones, was the county's last covered bridge.¹⁴ That year the board of supervisors also began planning for the replacement of one of its first all-iron spans: the bridge over the Middle River at Bevington.¹⁵ The problem was apparently not the structure's carrying capacity so much as its short span length. Fearing that the bridge would constrict the river or wash out in a flood, the board of supervisors opted to replace the structure entirely and move the old truss to another crossing. In April 1884 the board contracted with King and Twiss of Des Moines to fabricate and erect three iron trusses, including a new span at Bevington.¹⁶ Two months later the Madison County supervisors met with their Warren County counterparts at the Warren County Courthouse in Indianola. As they had in 1872, the supervisors of both counties

agreed to split the cost of construction, although the bridge actually lay completely within Madison County. As recorded by the clerks of both counties in their respective minutes:

The Board of Supervisors of Madison County met with the Board of Supervisors of Warren County in joint session this day [June 10th] at Indianola, Iowa, and agreed as follows. That a new iron bridge shall be put on the county line at Bevington at the crossing of the Middle River. Each county to pay one half the cost thereof. The material now ordered by Madison County viz an iron bridge 102 feet long, the lumber and piling for same, or other material that may be now ordered, to be accepted at the prices contracted therefor. The construction to be under the joint supervision of George Duncan of Madison County and J.W. Jones of Warren County, who are hereby authorized to make all the necessary arrangements therefor. Madison County to take the iron bridge now at Bevington and allow Warren County \$300.00 in full payment of their interest in said old bridge in the settlement of the cost of the new bridge.¹⁷

Straight from King Bridge Company's current roster of designs, the truss at Bevington features standard, pin-connected configuration and detailing.¹⁸ With a nominal roadway width of 14 feet and a span length of 102 feet, the truss is divided into six equal panels. It is comprised of rolled wrought iron members, built-up and machine-riveted in King's Cleveland shops. The inclined end posts and upper chords consist of two back-to-back channels, covered by a continuous iron plate on top and joined by batten plates beneath. The verticals are similarly configured, with two channels laced together by iron straps. (Two round eyerods form the verticals at the hips.) The lower chords and diagonals are each made up of two rectangular bars with punched eyes; the counters consist of round eyerods with unslotted turnbuckles. Bolted to the lower chord pins by U-bolts, the floor beams consist of two back-to-back channels reinforced by adjustable iron tension rods configured as "jack trusses". The struts are comprised of round tubes which form the pins at the upper chord connections, with knee-braced lattice struts at the portals. Both upper and lower lateral braces are round bars with unslotted turnbuckles. Timber stringers support a timber plank deck, and 2x12 boards form the guardrails.¹⁹

The bridge company began work on the structure soon after the contract award. The existing truss was moved to a crossing of North Clanton Creek near the Widow Spurgeon Farm in Walnut Township.²⁰ During June and July a King Bridge Company crew placed the concrete-filled, iron cylinder piers, built the timber pile approach spans and abutments and erected the iron truss. The new Bevington Bridge was completed by the end of July.²¹ It has carried traffic since, with only minor, maintenance-related replacement and repair of its wooden components.

Like virtually all of Iowa's counties, Madison County followed a definite progression in its bridge construction in the 19th century, in response to evolving transportation needs and technological development in the bridge industry. The first simple spans, built as the county was undergoing its initial settlement, were rudi-

mentary timber structures: cheap and easy to build but lacking in durability and limited in span length. With greater revenues from increased settlement, the county could undertake more ambitious timber trusses in the 1850s and 1860s. Iron was used for tension members in the covered combination spans erected during the 1860s and 1870s. But even with their plank and shingle sheathing, these timber trusses lacked the strength and durability of all-iron trusses. As a result, timber trusses were superseded by wrought iron configurations (either bowstrings or full trusses), which were readily available in the 1870s and 1880s through mass-production techniques. Although the county supervisors barely noticed the transition from iron to steel in the 1890s - and, indeed, continued to refer to new bridges as iron that were undoubtedly made of steel - this evolution marked a watershed that would continue into the 20th century for bridge fabricators and the rolling mills that supplied them.

Of the many substantial wagon bridges built in the 19th century by Madison County, only a few remain intact, and only one wrought iron through truss still exists. Featuring typical 1880s Pratt configuration and pin-connected detailing, the Bevington Bridge is significant as one of the last remaining examples in Madison County from what was once an extensive group of 19th century trusses: a well-preserved illustration of wrought iron truss construction. The span may be salvaged once again and moved to a new location, but its future is presently clouded.

Endnotes

¹*The History of Madison County, Iowa* (Des Moines: Union Historical Company, 1879), pages 455-470.

²Herman A. Mueller, ed., *History of Madison County, Iowa, and Its People* (Chicago: S.J. Clarke Publishing Company, 1915), page 173.

³According to local historian W.S. Wilkinson, the first bridge in Madison County "was built in the fall and winter of 1854-1855, across Middle River where the Indianola and Winterset road crossed that stream in Scott township now known as the Holliwell Bridge. Madison County paid John McCartney \$500.00 for building it. The bridge was a forty foot span with a framed approach at each end. It was a frame bridge with double bents at each end of the spans twenty-two feet high. The timbers of this bridge were hewn sixteen inches square. The stringers of the main span were forty-four feet long to lap at the ends of the bents. The framed approaches at each end were twenty feet long. The bridge was finished early in the spring of 1855." As quoted by Mrs. Fred Hartsook, "Interesting History behind Covered Bridges in Madison County," unpublished article written in 1933, pages 19-20, located at Winterset Public Library, Winterset, Iowa.

⁴Ibid., page 20; L.O. Cheever, "Covered Bridges Come to Iowa," *The Palimpsest*, November 1970, pages 481-482; Herman A. Mueller, *History of Madison County, Iowa, and Its People*, page 173. The Cox Bridge carried traffic until its replacement with a 96-foot-span steel truss in 1913. According to Mrs. Hartsook, "This bridge was removed because it was thought that the piers were so placed as to obstruct the flow of the stream. However, when the bridge was built, the old piers were left... [They] are still standing and are in excellent condition" in 1933.

⁵*Winterset Madisonian*, 12 January 1870.

⁶Mrs. Fred Hartsook, "Interesting History...", pages 20-22; Carla B. Burhans, "A Madison County Covered Bridge History," *The (Winterset) Festival Flyer*, 12-13 October 1974; L.O. Cheever, "Covered Bridges Come to Iowa," pages 483-485; Madison County Board of Supervisors Minute Book B: page 40 (4 January 1870), page 72 (5 January 1870), page 172 (22 November 1870), and page 167 (5 September 1871), located at the Madison County Auditor's Office, Madison County Courthouse, Winterset, Iowa.

⁷Mrs. Fred Hartsook, "Interesting History...", page 23.

⁸Laid out in 1872, only months before construction of the iron bridge, the town of Bevington was named after Dr. C.D. Bevington, a prominent Madison County businessman and railroad promoter. The town straddled the line between Madison and Warren Counties on the main road between the two county seats. *The History of Madison County, Iowa*, page 455.

⁹As recorded by the county clerk, "One thousand dollars or so much thereof as may be necessary are appropriated from the bridge fund for the bridge across the Middle River on the line between Warren and Madison Counties on the express condition that Warren County appropriate and provide half of the amount necessary to build said bridge and that the [local] petitioners built 35 feet of the aprons to said bridge and also advance to Madison County until April 1st, 1873, the money necessary to build said bridge..." Madison County Board of Supervisors Minute Book B, page 216 (3 September 1872).

¹⁰Madison County Board of Supervisors Minute Book B: 257 (5 June 1873), 259 (7 July 1873), 267, 271 (2 September 1873), 284 (20 December 1873), 326 (4 June 1874), and 336, 338 (10 September 1874).

¹¹For an excellent discussion of the development of the King Bridge Company, see David A. Simmons, "Bridge Building on a National Scale: The King Iron Bridge and Manufacturing Company," *IA: The Journal of the Society for Industrial Archeology*, Vol 15, No. 12 (1989), pages 23-39.

¹²*Des Moines: The Pioneer of Municipal Progress and Reform of the Middle West* (Chicago: S.J. Clarke Publishing Company, 1911), pages 250-253.

¹³*The Leading Industries of Des Moines, Iowa: A Review of Its Banking, Commercial, Real Estate and Manufacturing Interests* (Des Moines: People's Publishing and Advertising Company, 1888), pages 164-165.

¹⁴Spanning the North River in Douglas Township, the Hogback Bridge is the only one of the five remaining covered bridges in Madison County that still carries vehicular traffic. Mrs. Fred Hartsook, "Interesting History...", page 25; L.O. Cheever, "Covered Bridges Come to Iowa," page 482; Leslie C. Swanson, *Covered Bridges in Illinois, Iowa and Wisconsin* (Moline, Illinois: By the author, 1970, rev. 1986), pages 39-45.

¹⁵Bevington had grown at a steady, if unspectacular, pace in the 1870s, aided by the convenient river crossing here and its strategic location halfway between Winterset and Indianola on the wagon road and railroad. By the end of the decade, the settlement contained a population of 150, with two general stores, two hotels, two implement dealers, two blacksmith shops, two saloons, a drug store, furniture store, carpenter, wagon-maker, meat market, lumber yard and a grain elevator, among other sundry businesses. *The History of Madison County, Iowa*, page 455.

¹⁶The three bridges proposed in April 1884 would span the Middle River at Bevington, the North River in Union Township, and the Middle River in Webster Township. Madison County Board of Supervisors Minute Book D, pages 122-123 (11 April 1884); *Winterset Madisonian*, 24 April 1884.

¹⁷Madison County Board of Supervisors Minute Book D, page 145 (10 June 1884); Warren County Supervisors Minute Book 5, page 193 (10 June 1884).

¹⁸*King Iron Bridge & Manufacturing Co.* (Cleveland: no publ., 1884).

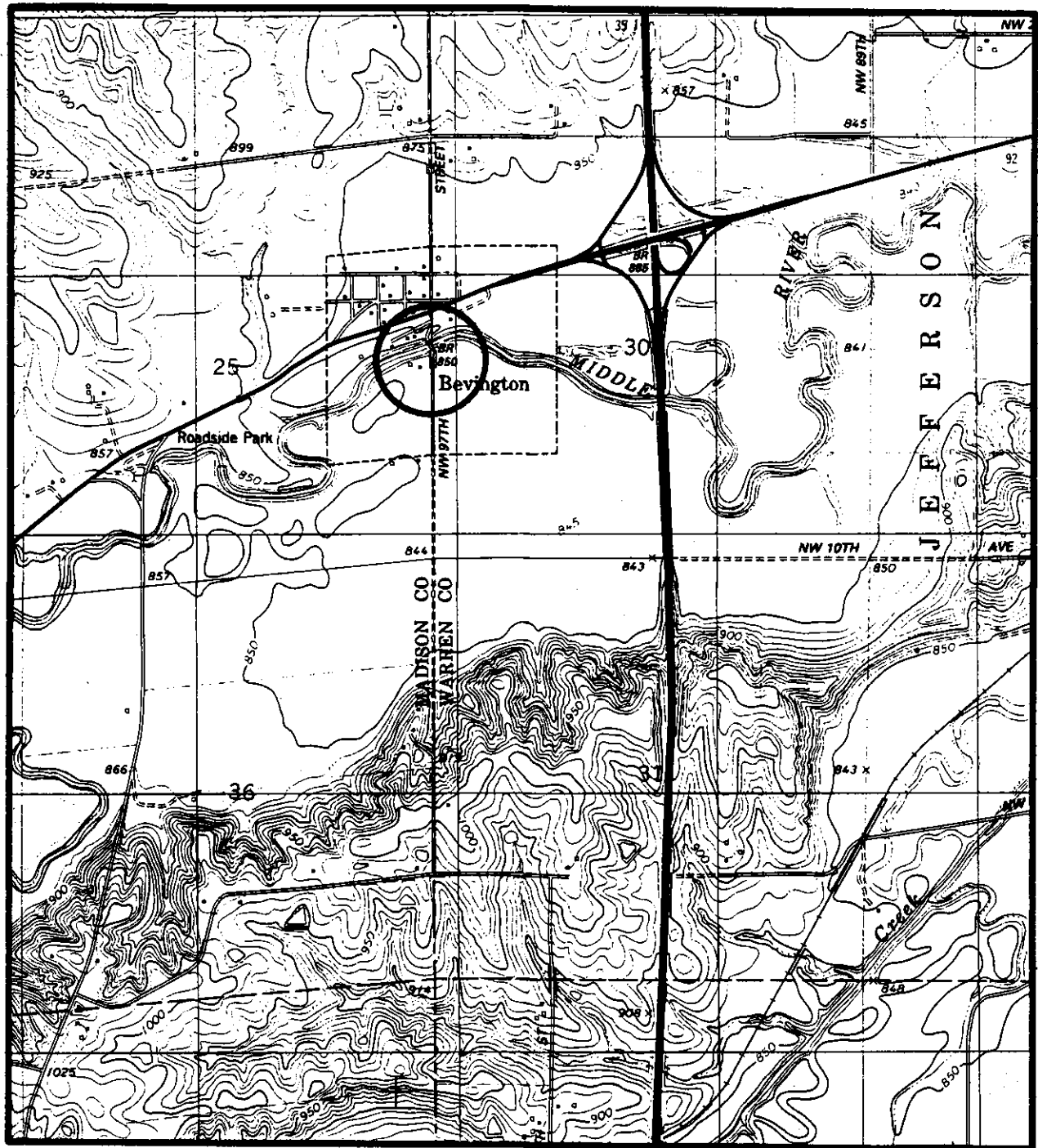
¹⁹The description is based upon an inspection of the bridge by Clayton Fraser, 9 February 1992.

²⁰*Winterset Madisonian*, 12 April 1884.

²¹Madison County Board of Supervisors Minute Book D, page 148 (26 July 1884); Warren County Board of Supervisors Minute Book 5, page 213 (2 September 1884).

Bibliography

- Burhans, Carla B. "A Madison County Covered Bridge History." *The (Winterset) Festival Flyer*, 12-13 October 1974.
- Cheever, L.O. "Covered Bridges Come to Iowa," *The Palimpsest*. November 1970, pages 452-496.
- Des Moines: The Pioneer of Municipal Progress and Reform of the Middle West*. Chicago: S.J. Clarke Publishing Company, 1911.
- Hartsook, Mrs. Fred. "Interesting History Behind Covered Bridges in [Madison] County." unpublished article written in 1933.
- The History of Madison County, Iowa*. Des Moines: Union Historical Company, 1879.
- King Iron Bridge & Manufacturing Co*. Cleveland: no publ., 1884.
- The Leading Industries of Des Moines, Iowa: A Review of Its Banking, Commercial, Real Estate and Manufacturing Interests*. Des Moines: People's Publishing and Advertising Company, 1888.
- Madison County Structure Inventory and Appraisal: Structure Number 000700, Bevington Bridge.
- Minute Books of the Madison County Board of Supervisors, 1870-1920.
- Minute Books of the Warren County Board of Supervisors, 1883-1920.
- Mueller, Herman A. *History of Madison County, Iowa, and Its People*. Chicago: S.J. Clarke Publishing Company, 1915.
- Sage, Leland L. *A History of Iowa*. Ames, Iowa: Iowa State University Press, 1974.
- Simmons, David A. "Bridge Building on a National Scale: The King Iron Bridge and Manufacturing Company." *IA: The Journal of the Society for Industrial Archeology*. XV:2, pages 23-39.
- Swanson, Leslie C. *Covered Bridges in Illinois, Iowa and Wisconsin*. Moline, Illinois: By the author, 1970, rev. 1986.
- Winterset Madisonian*. 12 January 1870, 5 April 1884, 12 April 1884, 24 April 1884, 3 September 1884.
- Young, Blair. *Madison County, Iowa*. Winterset, Iowa: Madison County Genealogical Society, 1984.



Taken from USGS St. Charles, Iowa, quadrangle map (7½ minute series, 1983).